

## BEAN VARIETIES FOR THE HUMID TROPICAL LOWLANDS

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### Introduction

Beans are traditionally cultivated in the medium and highland agro ecological zones (>1000 masl) of East and Central Africa. Most of the varieties developed in the last 20 years are adapted to the cooler altitudes. However, beans are widely consumed in the lowland areas in the region. But lowland production is limited because much of the research effort has concentrated in developing cultivars for the highland zones. Most of the beans consumed in the lowlands are produced in the highlands and exported to markets in lowland zone. For example, bean consumed in western lowland zone in the DR Congo are imported from the highland production zones in eastern parts of the country, especially in North Kivu province. Because of the poor communication system, beans are either airlifted or transported by river for more than 1000 km to west DR Congo. As a result, prices in Kinshasa and other markets are relatively high because of the high transportation costs, and are hardly affordable to the urban poor, contrary to the popular belief that bean is a 'poor man's meat. Interest for local bean production is growing in Congo (Brazzaville), Cameroon, Central African Republic, Cabinda (Angola) and other countries in the tropical humid lowlands of west and central Africa. For example, Institut National pour l'Etude et la Recherche Agronomiques (INERA), the national agricultural research Institute of the Democratic Republic of Congo, has identified bean as a priority crop for production in lowland zones of DR Congo because of increase in demand and potential for income generation for smallholder farmers. Development of bean varieties adapted to the humid lowlands can enhance productivity of beans in these regions. A collaborative program between the regional bean program and INERA was initiated to identify bean genotypes adapted to the lowland humid tropical zones in western Congo and neighbouring countries in West Africa. This report highlights progress in this program.

### Materials and Methods

Bean germplasm was introduced to INERA-M'vuazi from INERA research stations at Mulungu, Gandanjika, FOFIFA (Madagascar) and University of Nairobi (Kenya). The collection comprised of 80 sugar bean lines, 40 lines tolerant to low soil fertility from BILFA V nursery, 8 entries from FOFIFA bean program, and more than 86 F<sub>2</sub> and F<sub>3</sub> segregating populations from the regional multiple constraint nurseries at University of Nairobi and local collections. The collection was evaluated at M'vuazi, Kisantu and several on-farm sites in Bas Congo, Kinshasa and Bandu Provinces. M'vuazi, the main coordinating center for bean research is located at latitude 5°27'S, longitude 14° 54'E and 470 masl. It has mean annual temperature of 23.6°C and receives 1425 mm rainfall per year. All trial sites were below 1000 masl. The evaluations were conducted in collaboration with farmer groups, NGOs and community based organizations (CBOs).

## Results and Discussion

Twelve bean varieties adapted to lowland conditions have been released and are being disseminated in association with NGO's and farmers' associations. The varieties are: More 88002, PVO 14 (local landrace), PVO 14/2, T-3, A445, Diniania, Ntendezi (local landrace), Manseki, Nguaku-Nguaku, Tuta (Congolese landrace), G20854 and Lundamba. Ten varieties are in pre-release stages. These are Mbindi (from local germplasm), G22258, L4 (Congolese germplasm), I7 (Congolese landrace), G22501, Lyamungu 90, G16157, BF12 (Congolese landrace), BF10 and G8047. BILFA lines performing well include ZAA 5/2, G22258, Mwamafutala and AFR 593. Two lines KS 65-2 (sugar) and KS 47-1 (medium yellow) selected from regional nurseries have been identified for release.

Dissemination of the varieties is being conducted in collaboration with 14 NGOs and farmer's associations in areas near Mvuazi, and with INERA's Research and Development (extension) section and farmer associations and field schools in Kisantu, and with CADIM in Plateau de Bateke. Beans are grown over three seasons in the lowlands: Season A (November to February) is the main season. Season B (April to May) is used for seed production. In season C (June-October) beans are cultivated in valley bottoms on residual moisture. Cultivation in seasons A and B is on the 'uplands'. Major disease constraints to production in the lowlands include common bacterial blight, web blight, bean common mosaic virus, root rot, and rust. Major pests include bruchids, aphids and foliage/stem beetle (with symptoms similar to bean stem maggot). A visit to Kinshasa markets revealed that several of these released varieties were being traded. Yellows, whites and sugars dominated the markets in Kinshasa. Yellows were the most expensive (CFR 560 per kg) and dark browns, the cheapest (CFR 200 per kg).

INERA M'Vuazi has been instrumental in disseminating bean germplasm to other countries in West and Central Africa. Some of the genotypes distributed to Liberia, Central African Republic and Congo-Brazzaville are presented in Table 1.

**Table 1. Bean germplasm adapted to humid tropical lowlands distributed from INERA-M'vuazi.**

Destination	Type of Material	Number of accessions
Liberia	Advanced lines and released varieties	15
Central African Republic	*MCR lines	15
	White bean	8
	Sugars	11
Congo-Brazzaville	Released varieties	12

\*MCR= multiple constraint resistance

These results suggest that bean may be more plastic than expected. Some of the varieties performing well in lowlands (as low as 470 masl) such as Lyamungu 90 were selected for highland zones. Although climbing beans are traditionally grown at high altitudes, new medium altitude climbers were introduced in central and west Africa. Several climbing bean varieties were performing well at Mvuazi (470 masl). It appears that there is considerable potential for expanding bush and climbing bean production to lowland agroecological zones.